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THE CHINESE WHITE WAX INSECT.

BY PROFESSOR B. SILLIMAN.

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WE find the following note on this insect (a species of *Coccus*) in an interesting volume by T. T. Cooper.* Chemists have long known the so-called “vegetable wax,” “Chinese wax” or “pela,” also called “vegetable insect wax,” or “vegetable spermaceti,” but we have had no definite knowledge before of its history or mode of production.

It was generally stated to be produced on certain trees by the puncture of a species of *Coccus*. But Mr. Cooper supplies us with the first definite statement we have seen of what proves to be an extensive, and to us novel, industry. Unfortunately, he does not appear to have secured specimens of the insects producing it, nor does he give us more definite information of the plant on which they feed than that it resembles our privet.

It may be interesting to non-chemical readers to know that this insect wax is a definite compound somewhat resembling spermaceti in appearance but not in composition, being a *Cerotic ether* known as *Cerotate* of *Ceryl* of the formula $C^{59} H^{108} O^2$. It is crystalline, and of a dazzling whiteness like spermaceti, but more brittle and of a more fibrous texture. It does not completely saponify by boiling in potash water, but is completely decomposed when melted with potash, yielding cerotate of potassium and hydrate of ceryl. It is consumed in China for candles and also as a medicine. It melts at about 118° F. It does not appear clearly from the statements of Mr. Cooper, whether this wax is secreted by the insect or is not rather an exudation from the stems of the trees punctured by the insect. Mr. Cooper plainly favors the former supposition; but other writers of more pretensions to science entertain the opposite view. The plant on which the Chinese *Coccus* lives is stated to be *Ligustrum lucidum*.

There are several sorts of vegetable wax well known to chemists and new to commerce, and we find it stated by Rev. Justin Doolittle in his “Social life of the Chinese” that the “vegetable

*Travels of a Pioneer of Commerce in Pig Tail and Petticoats, on an overland Journey from China toward India. By T. T. Cooper. London. Murray, 1871. 8vo, pp. 471.

tallow" of China is obtained from the seeds or kernels which grow upon the so-called "Tallow Tree." But he also states that this tallow is hardened by a very hard white wax brought from the western or northwestern provinces of China, which is the very wax described by Mr. Cooper. The 'tallow' is not a wax in chemical constitution, and is the product of a shrub known as *Stillingia sebifera*. Our American myrtle wax (bayberry tallow) is a solid fat melting at about 118° F. and contains a large quantity of palmitic and a small quantity of myristic acid (Moore, Sill. Jour: [2] xxxiii, 113.)

From its high melting point and general physical and chemical properties we might infer that the white wax of China was the product of the *Coccus*, rather than of the plant on which it feeds, seeing the properties alluded to are more like those of bees' wax than of vegetable wax, known to be such. But of this we still lack the proof. Probably some of your entomological correspondents may know the wax producing, or provoking, *Coccus*.*

Our quotation from Mr. Cooper's instructive volume is as follows:—

"On the third day we entered the white wax country so named from its producing the famous white wax of Szchuan, which has been erroneously called vegetable wax. This district was less undulating than that of the tea gardens, and presented to the eye a view of extensive plains surrounded by low hills. The plains were all under wax and rice cultivation, the wax trees being planted round the embankments of the small paddy fields which were at most thirty yards square. The country thus presented to the passing traveller the appearance of extensive groves of tree stumps each as thick as a man's thigh and all uniformly cut down to a height of about eight feet, without a single branch. The cultivation of wax is a source of great wealth to the province of Szchuan, and ranks in importance second only to that of silk. Its production is not attended with much labor or risk to the cultivator. The eggs of the insect which produces the wax are annually imported from the districts of Hochin or HoKing and Whyli-tzou in Yunnan (where the culture of the eggs forms a special occupation) by merchants who deal in nothing else but Pa-la-tan "white wax eggs." The egg clusters which were described to me

* Westwood (Modern Classification of Insects ii. p. 449) writes thus: "The *Coccus ceriferus* Fabr., described by Anderson in his letters from Madras (1781) and by Pearson in the Phil. Trans. 1794, is employed in the production of a white wax, the body of the females being enveloped in a thick and solid coat of wax." It is now known that this wax as well as that of the honey bee is secreted by numerous minute secretory sacs or follicles lodged just beneath the skin of the abdomen.—Eds.

as about the size of a pea are transported carefully packed in baskets of the leaves of the Pa-la-shu, "white wax tree," which resembles a privet-shrub, and arrive in Szchuan in March, where they are purchased at about twenty taels per basket. The trees by the middle of March have thrown out a number of long tender shoots and leaves, and then the clusters of eggs enclosed in balls of the young leaves are suspended to the shoots by strings. About the end of the month the larvæ make their appearance, feed on the branches and leaves and soon attain the size of a small caterpillar or rather a wingless house-fly apparently covered with white down, with a delicate plume-like appendage, curving from the tail over the back. So numerous are they that as seen by me in Yunnan, the branches of the trees are whitened by them, and appear as if covered with feathery snow. The grub proceeds in July to take the chrysalis form, burying itself in a white wax secretion, just as a silkworm wraps itself in its cocoon of silk. All the branches of the trees are thus completely coated with wax an inch thick, and in the beginning of August are lopped off close to the trunk and cut into small lengths which are tied up in bundles and taken to the boiling houses, where they are transferred without further preparation to large cauldrons of water, and boiled until every particle of the waxy substance rises to the surface; the wax is skimmed off and run into moulds in which shape it is exported to all parts of the Empire.

It would seem that the wax growers find that it does not pay them to reserve any of the insects for their reproductive state, and hence the necessity of importing the eggs from Yunnan. In the district of Ho-chin and Why-li-tzou, where the culture of the eggs is alone attended to, both frost and snow is experienced, so that it would not be difficult to rear the insect in Europe, and considering its prolific nature, the production of white wax might repay the trouble of acclimatizing this curious insect."

INSTRUCTION TO SCIENCE TEACHERS AT SOUTH KENSINGTON.

DURING the months of June and July, a number of science teachers from various parts of England, Scotland, and Ireland, were assembled in London, for the purpose of attending special classes, arranged for their instruction under the auspices of the Science and Art Department. We propose to give some account of the course of instruction in the principles of Biology